

Title (en)  
Pump valve

Title (de)  
Pumpenventil

Title (fr)  
Clapet de pompe

Publication  
**EP 1369587 B1 20071205 (EN)**

Application  
**EP 03012530 A 20030602**

Priority  
• JP 2002161817 A 20020603  
• JP 2002326914 A 20021111

Abstract (en)  
[origin: EP1369587A2] Described is a pump which has reduced pressure loss by using fewer mechanical on-off valves, which has an increased reliability, which can be used under a high load pressure, which can be driven at a high frequency, and which has a good drive efficiency by increasing discharge fluid volume per pumping period. A circular diaphragm (5), disposed at the bottom portion of a case (7), has its outer peripheral edge secured to and supported by the case. A piezoelectric device (6) for moving the diaphragm is disposed at the bottom surface of the diaphragm. A space between the diaphragm and the top wall of the case is a pump chamber (3). An inlet flow path (1), having a check valve (4) serving as a flow resistor (4) disposed thereat, and an outlet flow path (2), which opens to the pump chamber during operation of the pump, open towards the pump chamber. In the pump, driving of the piezoelectric device is controlled so that an average displacement velocity in a pump chamber volume reducing step of the diaphragm becomes a velocity at which the diaphragm reaches the maximum-displacement position in a time equal to or less than 1/2 and equal to or greater than 1/10 of a natural vibration period T of fluid inside the pump chamber and the outlet flow path. <IMAGE>

IPC 8 full level  
**F04B 49/06** (2006.01); **F04B 53/10** (2006.01); **F04B 9/00** (2006.01); **F04B 39/10** (2006.01)

CPC (source: EP US)  
**F04B 39/1093** (2013.01 - EP US); **F04B 53/1077** (2013.01 - EP US)

Cited by  
DE102005055697B4; EP3387924A1; EP3387926A1; EP3387928A1; EP3387925A1; EP3387927A1; EP3387929A1; US10786011B2; EP2757263A1; DE102013100559A1

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